# BRUHATH BANGALORE MAHANAGARA PALIKE

Name of the Agency : **Technical Manager,** KRIDL, Bangalore.

Name of the Work : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.

Estimate Cost :

## QUALITY CONTROL REPORTS TO

**ASST. EXECUTIVE ENGINEER**
**Shettyhalli Sub Division,**
**BBMP, Bangalore.**


## CIVIL-TECH CONSULTANTS & ENGINEERS

**Building & Highway Material Testing Laboratory**
**NABL ACCREDITED LABORATOTY AS PER ISO / IEC – 17025:2005**
**No.23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara,**
**Basaveshwaranagar, Bangalore – 560 079.**

*QUALITY CONTROL REPORTS FOR*

**GRANUALAR SUB BASE (GSB)**

# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/GSB-1/GR/2015-16 Date : 20.04.2015

## GRADATION FOR GSB-I (CLOSE GRADED)
## IS: 2720 (Part 4)

**Customer** : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

**Agency** : **Technical Manager,** KRIDL, Bangalore.

**Name of work** : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.

**Reference** : BBMP/AEE/SSD/DZ/PR/2015-16

**Date of Testing** : 20.04.2015

**Sample Source** : GSB Mix Plant Bangalore. **Oven Dry Wt (gm) :** 25500

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Specified Limits |
|---|---|---|---|---|---|
| 75.0 | 0 | 0 | 0.00 | 0 | 100 |
| 53.0 | 995 | 995 | 3.90 | 96.10 | 80-100 |
| 26.50 | 6350 | 7345 | 28.80 | 71.20 | 55-90 |
| 9.50 | 4575 | 11920 | 46.75 | 53.25 | 35-65 |
| 4.75 | 3215 | 15135 | 59.35 | 40.65 | 25-55 |
| 2.36 | 2240 | 17375 | 68.14 | 31.86 | 20-40 |
| 0.425 | 4450 | 21825 | 85.59 | 14.41 | 10-25 |
| 0.075 | 2485 | 24310 | 95.33 | 4.67 | 3-10 |
| PAN | 1190 | | | | |
| Total | 25500 | | | | |

**Remarks:** Satisfies MORTH Specifications as per Table 400-1, Grading I

**Note:**

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3. Any Query regarding the report must be reported within 30 days from the date of testing.

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16-12

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ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
ಎಸ್ ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/GSB-1/AL/2015-16 Date : 20.04.2015

## ATTERBERG LIMITS TEST FOR GSB (CLOSE GRADED)
## IS : 2720 (Part - 5)

**Client** : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

**Agency** : **Technical Manager,** KRIDL, Bangalore.

**Name of work** : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.

**Reference** : BBMP/AEE/SSD/DZ/PR/2015-16

**Date of Testing** : 20.04.2015

As per MORTH Table : 400-11

| Sl. No. | Particulars | Test Results | Standards as per Specifications |
|---|---|---|---|
| 1 | Liquid Limit, % | 24.00 | 25.0% Maximum. |
| 2 | Plasticity Index, % | Non Plastic | 6.0% Maximum. |

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ಎಸ್.ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

*QUALITY CONTROL REPORTS FOR*

**WET MIX MACADAM (WMM)**

# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/WMM/Gradation/2015-16 27.04.2015

## GRADATION FOR WMM
## MORTH TABLE-400-11

**Client** : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

**Agency** : **Technical Manager,** KRIDL, Bangalore.

**Name of Work** : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.

**Reference** : BBMP/AEE/SSD/DZ/PR/2015-16

Date of Testing : 27.04.2015

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **25800**

| Is Sieve Size in mm | Weight Retained (gm) | Cumulative Weight Retained (gm) | Cumulative % of Retained | Cumulative % of Passing | Spec.Limits |
|---|---|---|---|---|---|
| 53 | 0 | 0 | 0 | 100 | 100 |
| 45 | 995 | 995 | 3.9 | 96.1 | 95-100 |
| 22.4 | 5530 | 6525 | 25.3 | 74.7 | 60-80 |
| 11.2 | 5675 | 12200 | 47.3 | 52.7 | 40-60 |
| 4.75 | 4480 | 16680 | 64.7 | 35.3 | 25-40 |
| 2.36 | 3525 | 20205 | 78.3 | 21.7 | 15-30 |
| 0.600 | 2245 | 22450 | 87.0 | 13.0 | 8-22 |
| 0.075 | 2230 | 24680 | 95.7 | 4.3 | 0-8 |

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/WMM/AIV/2015-16 27.04.2015

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Client** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of the Work** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Source / Location** | WMM Plant |
| **Type of Mix** | Wet Mix macadam |
| **Date of Testing** | 27.04.2015 |

| Sl No. | Details | Trial No. 1 | Trial No. 2 | Average |
|---|---|---|---|---|
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 381 | 385 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 87 | 85 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 294 | 300 | |
| 4 | Aggregate Impact value = percent fines | 22.83 | 22.08 | |
| | 100* ($W_2/W_1$)% | | | 22.46 |

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

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Job No.: CTCE/BBMP/KRIDL/W.No.12/WMM/S-T/2015-16 27.04.2015

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager,** KRIDL, Bangalore. |
| Name of Work | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| Reference | BBMP/AEE/SSD/DZ/PR/2015-16 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | Wet Mix Macadam |
| Date of Testing | 27.04.2015 |

Result : Flakiness Index = **11.87%**

Elongation Index = **13.65%**

**Result : Combined Flakiness & Elongation index 25.52%**

Comments:

→ Maximum allowable Flakinee & Elongation Index for Wet Mix Macadam is 30%

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

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Job No.: CTCE/BBMP/KRIDL/W.No.12/WMM/AL/2015-16 27.04.2015

## ATTERBERG LIMITS TEST FOR WMM
## MORTH TABLE-400-11

**Client** : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore.

**Agency** : **Technical Manager,** KRIDL, Bangalore.

**Name of Work** : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore.

**Reference** : BBMP/AEE/SSD/DZ/PR/2015-16

Date of Testing : 27.04.2015

Material : WMM

Sample Location : WMM Mix Plant

As per MORTH Table 400-11

| Sl. No. | Particulars | Test Results | Standards as per Specifications |
|---|---|---|---|
| 1 | Liquid Limit, % | 23.50 | 25.0% Maximum. |
| 2 | Plasticity Index, % | Non Plastic | 6.0% Maximum. |

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*QUALITY CONTROL REPORTS FOR*

**BITUMINOUS MACADAM**

# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/BM/Bitumen/2015-16 04.05.2015

## BITUMEN CONTENT DETERMINATION OF BITUMINOUS MACADAM MIX

**As Per IRC:SP:11-1984**

| | |
|---|---|
| CUSTOMER | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager,** KRIDL, Bangalore. |
| NAME OF THE WORK | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| REFERENCE | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE I/D | Roads in Ragavendra Layout W.No.12 |
| DATE OF TESTING | 04.05.2015 |

**BITUMEN CONTENT DETERMINATION**

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 482.5 | 482 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 17.5 | 18.00 |
| 7. Bitumen content in % | 3.50 | 3.60 |
| 8. Average | **3.55** | |

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/BM/Bitumen/2015-16 04.05.2015

## GRADATION DETERMINATION OF BITUMINOUS MACADAM MIX

**As Per IS 2386 and IRC:SP:11-1984**

| | |
|---|---|
| CUSTOMER | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager,** KRIDL, Bangalore. |
| NAME OF THE WORK | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| REFERENCE | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE I/D | Roads in Ragavendra Layout W.No.12 |
| DATE OF TESTING | 04.05.2015 |

**GRADATION AFTER EXTRACTION**

| Sieve Size in mm | Trail 1 | | | | Specified Limits as per MORTH specification table 500-04 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 26.5 | 0 | 0 | 0 | 100 | 100 |
| 19 | 35.23 | 7.30 | 7.30 | 92.70 | 90-100 |
| 13.2 | 126.7 | 26.26 | 33.56 | 66.44 | 56-88 |
| 4.75 | 231.7 | 48.02 | 81.58 | 18.42 | 16-36 |
| 2.36 | 55.82 | 11.57 | 93.15 | 6.85 | 4-19 |
| 0.3 | 12.58 | 2.61 | 95.76 | 4.24 | 2-10 |
| 0.075 | 4.12 | 0.85 | 96.61 | 3.39 | 0-8 |

| Sieve Size in mm | Trail 2 | | | | Specified Limits as per MORTH specification table 500-04 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 26.5 | 0 | 0 | 0 | 100 | 100 |
| 19 | 35.62 | 7.39 | 7.39 | 92.61 | 90-100 |
| 13.2 | 123.7 | 25.66 | 33.05 | 66.95 | 56-88 |
| 4.75 | 226.8 | 47.05 | 80.11 | 19.89 | 16-36 |
| 2.36 | 53.23 | 11.04 | 91.15 | 8.85 | 4-19 |
| 0.3 | 13.24 | 2.75 | 93.90 | 6.10 | 2-10 |
| 0.075 | 3.52 | 0.73 | 94.63 | 5.37 | 0-8 |

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# QUALITY CONTROL REPORTS FOR

# BITUMINOUS CONCRETE

# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377


Job No.: CTCE/BBMP/KRIDL/W.No.12/CSR.04/829a/BC(QB)/2015-16 30.04.2015

## TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

| | | |
|---|---|---|
| * CUSTOMER | : | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| * AGENCY | : | **Technical Manager,** KRIDL, Bangalore. |
| * NAME OF PROJECT | : | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| REFERENCE | : | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE ID | : | Bitumen |
| SAMPLE RECEIVED ON | : | 30.04.2015 |
| DATE OF TESTING | : | 30.04.2015 |

The results of the tests conducted on the Bitumen sample for Bituminous Concrete are as follows:

| Sl.No | Description | Technical Reference | Test Result | Requirement as per IS: 73-2013 |
|---|---|---|---|---|
| 1 | Penetration at 25$^0$C, 100g, 5 Sec 1/10 mm | IS: 1203-1978 (RA-2009) | 64.0 | 60 to 70 |
| 2 | Softening point, $^0$C | IS: 1205-1978 (RA-2009) | 48.0 | Min. 45 |
| 3 | Ductility at 27$^0$C, cm | IS: 1208-1978 (RA-2009) | 100 > | Min. 50 |
| 4 | Flash Point, $^0$C | IS: 1209-1978 (RA-2009) | 296 | Min. 220 |

*Information is furnished by the Customer/Representative.

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377


Job No.: CTCE/BBMP/KRIDL/W.No.12/CSR.04/829a/BC(QB)/2015-16 30.04.2015

## TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

| | | |
|---|---|---|
| * CUSTOMER | : | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| * AGENCY | : | **Technical Manager,** KRIDL, Bangalore. |
| * NAME OF PROJECT | : | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| REFERENCE | : | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE ID | : | Bitumen |
| SAMPLE RECEIVED ON | : | 30.04.2015 |
| DATE OF TESTING | : | 30.04.2015 |

The results of the tests conducted on the Bitumen sample for Bituminous Concrete are as follows:

| Sl.No | Description | Technical Reference | Test Result | Requirement as per IS: 73-2013 |
|---|---|---|---|---|
| 1 | Penetration at 25$^0$C, 100g, 5 Sec 1/10 mm | IS: 1203-1978 (RA-2009) | 63.0 | 60 to 70 |
| 2 | Softening point, $^0$C | IS: 1205-1978 (RA-2009) | 51.0 | Min. 45 |
| 3 | Ductility at 27$^0$C, cm | IS: 1208-1978 (RA-2009) | 100 > | Min. 50 |
| 4 | Flash Point, $^0$C | IS: 1209-1978 (RA-2009) | 302 | Min. 220 |

*Information is furnished by the Customer/Representative.

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AE-12

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ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
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ಎಸ್.ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

*********

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/AIV/2015-16 30.04.2015

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of Project** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 30.04.2015 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 387 | 389 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 85 | 84 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 302 | 305 | |
| 4 | Aggregate Impact value = percent fines | | | |
| | 100* ($W_2/W_1$) percent | 21.96 | 21.59 | **21.78** |

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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ಎಸ್.ಐ.ಟಿ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

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## Aggregate Impact Value

IS: 2386 Part IV

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|---|---|
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| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 30.04.2015 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 390.5 | 389 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 88 | 85 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 302.5 | 304 | |
| 4 | Aggregate Impact value = percent fines<br>100* ($W_2/W_1$) percent | 22.54 | 21.85 | **22.19** |

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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AE - 12
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Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/AIV/2015-16 30.04.2015

## Aggregate Impact Value

IS: 2386 Part IV

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|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of Project** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 30.04.2015 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 385 | 384 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 87 | 82.5 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 298 | 301.5 | |
| 4 | Aggregate Impact value = percent fines<br>100* ($W_2/W_1$) percent | 22.60 | 21.48 | **22.04** |

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/AIV/2015-16 30.04.2015

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of Project** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 30.04.2015 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 388 | 390 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 85 | 88 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 303 | 302 | |
| 4 | Aggregate Impact value = percent fines<br>100* ($W_2/W_1$) percent | 21.91 | 22.56 | 22.24 |

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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## Aggregate Impact Value

IS: 2386 Part IV

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|---|---|
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| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 30.04.2015 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 383 | 385 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 81 | 82.5 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 302 | 302.5 | |
| 4 | Aggregate Impact value = percent fines | | | |
| | 100* ($W_2/W_1$) percent | 21.15 | 21.43 | **21.29** |

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/AIV/2015-16 30.04.2015

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
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| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Source / Location** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 30.04.2015 |

| Sl No. | Details | Trial No. | | Average |
|---|---|---|---|---|
| | | 1 | 2 | |
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 390 | 387 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 82 | 87 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 308 | 300 | |
| 4 | Aggregate Impact value = percent fines<br>100* ($W_2/W_1$) percent | 21.03 | 22.48 | **21.75** |

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Shape.T/2015-16 : 02.05.2015

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| Agency | : **Technical Manager,** KRIDL, Bangalore. |
| Name of Project | : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| Reference | : BBMP/AEE/SSD/DZ/PR/2015-16 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | : Bituminous Concrete |
| Date of Testing | : 02.05.2015 |

Result : Flakiness Index = **12.48%**

Elongation Index = **13.49%**

Result : Combined Flakiness & Elongation index **25.97%**

Note:

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Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Shape.T/2015-16 : 02.05.2015

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| Agency | : **Technical Manager,** KRIDL, Bangalore. |
| Name of Project | : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| Reference | : BBMP/AEE/SSD/DZ/PR/2015-16 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | : Bituminous Concrete |
| Date of Testing | : 02.05.2015 |

Result : Flakiness Index = **11.85%**

Elongation Index = **13.93%**

Result : Combined Flakiness & Elongation index **25.78%**

Note:

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Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Shape.T/2015-16 : 02.05.2015

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| Agency | : **Technical Manager,** KRIDL, Bangalore. |
| Name of Project | : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| Reference | : BBMP/AEE/SSD/DZ/PR/2015-16 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | : Bituminous Concrete |
| Date of Testing | : 02.05.2015 |

Result : Flakiness Index = **11.58%**

Elongation Index = **13.96%**

Result : Combined Flakiness & Elongation index **25.54%**

Note:

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## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
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| Reference | : BBMP/AEE/SSD/DZ/PR/2015-16 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | : Bituminous Concrete |
| Date of Testing | : 02.05.2015 |

Result : Flakiness Index = **12.47%**

Elongation Index = **13.86%**

Result : Combined Flakiness & Elongation index **26.33%**

Note:

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ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Shape.T/2015-16 : 02.05.2015

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| Agency | : **Technical Manager,** KRIDL, Bangalore. |
| Name of Project | : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| Reference | : BBMP/AEE/SSD/DZ/PR/2015-16 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | : Bituminous Concrete |
| Date of Testing | : 02.05.2015 |

Result : Flakiness Index = **11.86%**

Elongation Index = **13.54%**

Result : Combined Flakiness & Elongation index **25.40%**

Note:

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ಜಿಸ್.ಎಚ್ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು.

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Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Shape.T/2015-16 : 02.05.2015

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | : **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| Agency | : **Technical Manager,** KRIDL, Bangalore. |
| Name of Project | : Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| Reference | : BBMP/AEE/SSD/DZ/PR/2015-16 |
| Technical Reference | : IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | : Bituminous Concrete |
| Date of Testing | : 02.05.2015 |

Result : Flakiness Index = **11.96%**

Elongation Index = **13.52%**

Result : Combined Flakiness & Elongation index **25.48%**

Note:

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Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Stripping/2015-16 05.05.2015

## Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of Project** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 05.05.2015 |

Type of binder : 60/70

Percentage of binder used : 5.00% by wt.

Total weight of aggregate : 200 g

Total weight of binder : 10.00 g

Temperature of water-bath : 40° C

| Observation Number | Stripping, Percentage | Average, Percentage | Average Retained Coating, % |
|---|---|---|---|
| 1 | 3.2 | 3.30 | 96.70 |
| 2 | 3.3 | | |
| 3 | 3.4 | | |

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

**Note:**

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

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**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Sp_Wa/2015-16 06.05.2015

## Specific Gravity And Water Absorption Test

IS: 2386 Part III

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of Project** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 06.05.2015 |

| Sl. No. | Details | Notation | Test Number | | | Mean Value |
|---|---|---|---|---|---|---|
| | | | Test 1 | Test 2 | Test 3 | |
| 1 | Weight of aggregate suspended in water with the basket | $W_1$ g | 2022 | 2025 | 2023 | |
| 2 | Weight of basket suspended in water | $W_2$ g | 755 | 755 | 755 | |
| 3 | Weight of saturated aggregate in water | $(W_1 - W_2) = W_s$ g | 1267 | 1270 | 1268 | |
| 4 | Weight of saturated surface dry aggregate in air | $W_3$ g | 2012 | 2015 | 2011 | |
| 5 | Weight of water equal to the volume of the aggregate | $(W_3 - W_S)$ g | 745 | 745 | 743 | |
| 6 | Weight of oven dried aggregate | $W_4$ g | 1995 | 1999 | 1994 | |
| 7 | Specific Gravity | $W_4/(W_3-W_S)$ | 2.678 | 2.683 | 2.684 | 2.682 |
| 8 | Apparent Specific gravity | $W_4/(W_4-W_S)$ | 2.740 | 2.742 | 2.747 | 2.743 |
| 9 | Water Absorption | $((W_3-W_4)*100)/W_4$ | 0.85% | 0.80% | 0.85% | 0.84% |

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


JobNo: CTCE/BBMP/KRIDL/W.No.12/BC/Bitumen/2015-16 05.05.2015

## BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

**As Per IRC:SP:11-1984**

| | |
|---|---|
| CUSTOMER | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager,** KRIDL, Bangalore. |
| NAME OF PROJECT | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| REFERENCE | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE I/D | Roads in Raghavendra Layout W.No.12 |
| DATE OF TESTING | 05.05.2015 |

**BITUMEN CONTENT DETERMINATION**

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 474 | 473.5 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 26 | 26.50 |
| 7. Bitumen content in % | 5.20 | 5.30 |
| 8. Average | **5.25** | |

Note:

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ಎಸ್.ಎಂ ರಸ್ತೆ, ರವೀಂದ್ರನಗರ, ಬೆಂಗಳೂರು

# CIVIL-TECH CONSULTANTS AND ENGINEERS

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JobNo: CTCE/BBMP/KRIDL/W.No.12/BC/Bitumen/2015-16 05.05.2015

## GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

### AS PER IS2386 & IRC:SP:11-1984

| | |
|---|---|
| CUSTOMER | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager,** KRIDL, Bangalore. |
| NAME OF PROJECT | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, |
| REFERENCE | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE I/D | Roads in Raghavendra Layout W.No.12 |
| DATE OF TESTING | 05.05.2015 |

**GRADATION AFTER EXTRACTION**

| Sieve Size in mm | Trail 1 | | | | Specified Limits as per MORTH specification table 500-18 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 19 | 0 | 0 | 0 | 100 | 100 |
| 13.2 | 46.87 | 9.89 | 9.89 | 90.11 | 79-100 |
| 9.5 | 32.63 | 6.88 | 16.77 | 83.23 | 70-88 |
| 4.75 | 75.89 | 16.01 | 32.78 | 67.22 | 53-71 |
| 2.36 | 86.45 | 18.24 | 51.02 | 48.98 | 42-58 |
| 1.18 | 64.53 | 13.61 | 64.64 | 35.36 | 34-48 |
| 0.6 | 37.89 | 7.99 | 72.63 | 27.37 | 26-38 |
| 0.3 | 31.25 | 6.59 | 79.22 | 20.78 | 18-28 |
| 0.15 | 27.69 | 5.84 | 85.06 | 14.94 | 12-20 |
| 0.075 | 33.58 | 7.08 | 92.15 | 7.85 | 4-10 |

| Sieve Size in mm | Trail 2 | | | | Specified Limits as per MORTH specification table 500-18 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 19 | 0 | 0 | 0 | 100 | 100 |
| 13.2 | 47.96 | 10.13 | 10.13 | 89.87 | 79-100 |
| 9.5 | 42.54 | 8.98 | 19.11 | 80.89 | 70-88 |
| 4.75 | 73.28 | 15.48 | 34.59 | 65.41 | 53-71 |
| 2.36 | 71.85 | 15.17 | 49.76 | 50.24 | 42-58 |
| 1.18 | 69.98 | 14.78 | 64.54 | 35.46 | 34-48 |
| 0.6 | 41.58 | 8.78 | 73.32 | 26.68 | 26-38 |
| 0.3 | 32.15 | 6.79 | 80.11 | 19.89 | 18-28 |
| 0.15 | 24.96 | 5.27 | 85.39 | 14.61 | 12-20 |
| 0.075 | 27.58 | 5.82 | 91.21 | 8.79 | 4-10 |

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JobNo: CTCE/BBMP/KRIDL/W.No.12/BC/Bitumen/2015-16 06.05.2015

## BITUMEN CONTENT DETERMINATION OF BITUMINOUS CONCRETE MIX

**As Per IRC:SP:11-1984**

| | |
|---|---|
| CUSTOMER | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager,** KRIDL, Bangalore. |
| NAME OF PROJECT | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| REFERENCE | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE I/D | Roads in Raghavendra Layout W.No.12 |
| DATE OF TESTING | 06.05.2015 |

**BITUMEN CONTENT DETERMINATION**

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 474 | 474 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 26 | 26.00 |
| 7. Bitumen content in % | 5.20 | 5.20 |
| 8. Average | **5.20** | |

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ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ
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JobNo: CTCE/BBMP/KRIDL/W.No.12/BC/Bitumen/2015-16 06.05.2015

## GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

### AS PER IS2386 & IRC:SP:11-1984

| | |
|---|---|
| CUSTOMER | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager,** KRIDL, Bangalore. |
| NAME OF PROJECT | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, |
| REFERENCE | BBMP/AEE/SSD/DZ/PR/2015-16 |
| SAMPLE I/D | Roads in Raghavendra Layout W.No.12 |
| DATE OF TESTING | 06.05.2015 |

**GRADATION AFTER EXTRACTION**

| Sieve Size in mm | Trail 1 | | | | Specified Limits as per MORTH specification table 500-18 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 19 | 0 | 0 | 0 | 100 | 100 |
| 13.2 | 47.25 | 9.97 | 9.97 | 90.03 | 79-100 |
| 9.5 | 33.26 | 7.02 | 16.99 | 83.01 | 70-88 |
| 4.75 | 76.58 | 16.16 | 33.14 | 66.86 | 53-71 |
| 2.36 | 84.25 | 17.77 | 50.92 | 49.08 | 42-58 |
| 1.18 | 66.59 | 14.05 | 64.96 | 35.04 | 34-48 |
| 0.6 | 36.15 | 7.63 | 72.59 | 27.41 | 26-38 |
| 0.3 | 32.52 | 6.86 | 79.45 | 20.55 | 18-28 |
| 0.15 | 26.58 | 5.61 | 85.06 | 14.94 | 12-20 |
| 0.075 | 35.62 | 7.51 | 92.57 | 7.43 | 4-10 |

| Sieve Size in mm | Trail 2 | | | | Specified Limits as per MORTH specification table 500-18 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 19 | 0 | 0 | 0 | 100 | 100 |
| 13.2 | 46.58 | 9.83 | 9.83 | 90.17 | 79-100 |
| 9.5 | 43.16 | 9.11 | 18.93 | 81.07 | 70-88 |
| 4.75 | 72.48 | 15.29 | 34.22 | 65.78 | 53-71 |
| 2.36 | 68.52 | 14.46 | 48.68 | 51.32 | 42-58 |
| 1.18 | 71.25 | 15.03 | 63.71 | 36.29 | 34-48 |
| 0.6 | 42.67 | 9.00 | 72.71 | 27.29 | 26-38 |
| 0.3 | 36.53 | 7.71 | 80.42 | 19.58 | 18-28 |
| 0.15 | 27.48 | 5.80 | 86.22 | 13.78 | 12-20 |
| 0.075 | 26.15 | 5.52 | 91.73 | 8.27 | 4-10 |

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Agg/2015-16 05.05.2015

## Aggregate Gradation Test

IS : 2386 Part I

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of Project** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 Dated: 04.06.2015 |
| **Sample I / D** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 05.05.2015 |

Total Weight of Sample: **5100** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | JOBMIX Gradation as per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 19 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Bituminous concrete Grade-II specification as per MORTH |
| 13.2 | 496 | 9.73 | 9.73 | 90.27 | 79 - 100 | |
| 9.5 | 515 | 10.10 | 19.82 | 80.18 | 70 - 88 | |
| 4.75 | 696 | 13.65 | 33.47 | 66.53 | 53 - 71 | |
| 2.36 | 623 | 12.22 | 45.69 | 54.31 | 42 - 58 | |
| 1.18 | 608 | 11.92 | 57.61 | 42.39 | 34 - 48 | |
| 0.600 | 648 | 12.71 | 70.31 | 29.69 | 26 - 38 | |
| 0.300 | 526 | 10.31 | 80.63 | 19.37 | 18 - 28 | |
| 0.150 | 287 | 5.63 | 86.25 | 13.75 | 12 - 20 | |
| 0.075 | 393 | 7.71 | 93.96 | 6.04 | 4 - 10 | |

Total Weight of Sample: **4960** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | JOBMIX Gradation as per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 19 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Bituminous concrete Grade-II specification as per MORTH |
| 13.2 | 629 | 12.68 | 12.68 | 87.32 | 79 - 100 | |
| 9.5 | 485 | 9.78 | 22.46 | 77.54 | 70 - 88 | |
| 4.75 | 646 | 13.02 | 35.48 | 64.52 | 53 - 71 | |
| 2.36 | 528 | 10.65 | 46.13 | 53.87 | 42 - 58 | |
| 1.18 | 648 | 13.06 | 59.19 | 40.81 | 34 - 48 | |
| 0.600 | 523 | 10.54 | 69.74 | 30.26 | 26 - 38 | |
| 0.300 | 456 | 9.19 | 78.93 | 21.07 | 18 - 28 | |
| 0.150 | 399 | 8.04 | 86.98 | 13.02 | 12 - 20 | |
| 0.075 | 357 | 7.20 | 94.17 | 5.83 | 4 - 10 | |

Ward-12

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು ಶೆಟ್ಟಿಹಳ್ಳಿ ಉಪವಿಭಾಗ, ದಾಸರಹಳ್ಳಿ ವಲಯ ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

**Note:**

⇒ This test report should not be reproduced except in full, without written approval of the laboratory

⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory

⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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M/s. Civil-Tech Consultants & Engineers

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# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005


Job No.: CTCE/BBMP/KRIDL/W.No.12/BC/Agg/2015-16 06.05.2015

## Aggregate Gradation Test

IS : 2386 Part I

| | |
|---|---|
| **Customer** | **Asst. Executive Engineer,** Shettyhalli Sub Division, BBMP, Bangalore. |
| **Agency** | **Technical Manager,** KRIDL, Bangalore. |
| **Name of Project** | Improvements to Main and Cross Roads at Dhanpal Layout and Raghavendra Layout in Ward No.12, Shettyhalli Sub Division, BBMP, Bangalore. |
| **Reference** | BBMP/AEE/SSD/DZ/PR/2015-16 Dated: 04.06.2015 |
| **Sample I / D** | Hot Mix Plant, Bangalore |
| **Type of Mix** | Bituminous Concrete |
| **Date of Testing** | 06.05.2015 |

Total Weight of Sample: **5150** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | JOBMIX Gradation as per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 19 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Bituminous concrete Grade-II specification as per MORTH |
| 13.2 | 493 | 9.57 | 9.57 | 90.43 | 79 - 100 | |
| 9.5 | 525 | 10.19 | 19.77 | 80.23 | 70 - 88 | |
| 4.75 | 698 | 13.55 | 33.32 | 66.68 | 53 - 71 | |
| 2.36 | 635 | 12.33 | 45.65 | 54.35 | 42 - 58 | |
| 1.18 | 610 | 11.84 | 57.50 | 42.50 | 34 - 48 | |
| 0.600 | 649 | 12.60 | 70.10 | 29.90 | 26 - 38 | |
| 0.300 | 515 | 10.00 | 80.10 | 19.90 | 18 - 28 | |
| 0.150 | 296 | 5.75 | 85.84 | 14.16 | 12 - 20 | |
| 0.075 | 398 | 7.73 | 93.57 | 6.43 | 4 - 10 | |

Total Weight of Sample: **5100** gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | JOBMIX Gradation as per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 19 | 0 | 0 | 0 | 100 | 100 | Gradation satisfies Bituminous concrete Grade-II specification as per MORTH |
| 13.2 | 632 | 12.39 | 12.39 | 87.61 | 79 - 100 | |
| 9.5 | 489 | 9.59 | 21.98 | 78.02 | 70 - 88 | |
| 4.75 | 652 | 12.78 | 34.76 | 65.24 | 53 - 71 | |
| 2.36 | 531 | 10.41 | 45.18 | 54.82 | 42 - 58 | |
| 1.18 | 653 | 12.80 | 57.98 | 42.02 | 34 - 48 | |
| 0.600 | 515 | 10.10 | 68.08 | 31.92 | 26 - 38 | |
| 0.300 | 468 | 9.18 | 77.25 | 22.75 | 18 - 28 | |
| 0.150 | 402 | 7.88 | 85.14 | 14.86 | 12 - 20 | |
| 0.075 | 363 | 7.12 | 92.25 | 7.75 | 4 - 10 | |

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